Listing of Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-63. (Cancelled)

64. (Currently Amended) A method for detecting an analyte within a test sample, the method comprising:

i) providing a lateral flow assay device that comprises a porous membrane in fluid communication with phosphorescent particles conjugated with a specific binding member, the phosphorescent particles comprising a phosphorescent label encapsulated within a matrix, the phosphorescent label emitting a detection signal having an emission lifetime of about 1 microsecond or more following excitation of the phosphorescent label and having a Stokes shift of greater than about 100 nanometers, wherein the porous membrane defines a detection zone within which is immobilized a capture reagent;

ii) contacting the lateral flow assay device with the test sample;

iii) subjecting the detection zone to illumination pulses to generate [[a]] the detection signal; and

iv) thereafter, measuring the intensity of the detection signal, wherein the amount of the analyte within the test sample is proportional to the intensity of the detection signal.

65. (Previously Presented) The method of claim 64, wherein the phosphorescent label comprises a metal selected from the group consisting of ruthenium, osmium, rhenium, platinum, palladium, and combinations thereof.

66. (Previously Presented) The method of claim 64, wherein the phosphorescent label comprises a ligand selected from the group consisting of pyridine, pyrazine, isonicotinamide, imidazole, bipyridine, terpyridine, phenanthroline, dipyridophenazine, porphyrin, porphine, derivatives thereof, and combinations thereof.

67. (Previously Presented) The method of claim 66, wherein the ligand is a porphyrin ligand, porphine ligand, or derivative thereof.

68. (Previously Presented) The method of claim 66, wherein the metal complex comprises a bipyridine ligand or derivative thereof.

69. (Previously Presented) The method of claim 64, wherein the phosphorescent label comprises platinum (II) coproporphyrin-I and III, palladium (II) coproporphyrin, ruthenium coproporphyrin, zinc(II)-coproporphyrin-I, platinum(II) tetra-meso-fluorophenylporphine, palladium(II) tetra-meso-fluorophenylporphine, derivatives thereof, and combinations thereof.

70. (Previously Presented) The method of claim 64, wherein the matrix comprises metal oxide particles, polymer particles, or combinations thereof.

71. (Previously Presented) The method of claim 64, wherein the particles have an average size of from about 0.1 nanometers to about 100 microns.

72. (Previously Presented) The method of claim 64, wherein the particles have an average size of from about 1 nanometer to about 10 microns.

73. (Previously Presented) The method of claim 64, wherein the matrix acts as a barrier to protect the phosphorescent label from quenching.

74. (Previously Presented) The method of claim 73, wherein about 30% or less of the detection signal is quenched when the phosphorescent particles are exposed to a quencher.

75. (Previously Presented) The method of claim 73, wherein about 20% or less of the detection signal is quenched when the detection probes are exposed to a quencher.

76. (Previously Presented) The method of claim 64, wherein the phosphorescent label emits a detection signal having an emission lifetime of about 10 microseconds or more.

77. (Previously Presented) The method of claim 64, wherein the phosphorescent label emits a detection signal having an emission lifetime of about 100 to about 1000 microseconds.

78. (Previously Presented) The method of claim 64, wherein the intensity of the detection signal is measured from about 1 to about 100 microseconds after the detection zone is subjected to one or more pulses of illumination.

79. (Previously Presented) The method of claim 64, wherein the capture reagent is selected from the group consisting of antigens, haptens, protein A or G, neutravidin, avidin, streptavidin, captavidin, primary or secondary antibodies, and complexes thereof.

80. (Previously Presented) The method of claim 64, wherein the illumination is provided by a pulsed excitation source.

81. (Previously Presented) The method of claim 64, wherein the intensity of the detection signal is measured by a time-gated detector.

82. (Previously Presented) The method of claim 64, wherein the specific binding member is selected from the group consisting of antigens, haptens, aptamers, primary or secondary antibodies, biotin, and combinations thereof.

83. (Previously Presented) The method of claim 64, wherein the specific binding member is configured to preferentially bind with the analyte.

84. (Previously Presented) The method of claim 64, wherein the specific binding member is the same as or an analog of the analyte.

85. (Previously Presented) The method of claim 64, wherein the porous membrane further defines a calibration zone within which is immobilized a capture reagent.

86-88. (Canceled)

89. (Previously Presented) The method of claim 85, further comprising subjecting the calibration zone to illumination pulses to generate a calibration signal.

90. (Previously Presented) The method of claim 85, wherein the capture reagent is capable of binding the phosphorescent particles.

91. (Previously Presented) The method of claim 85, wherein the capture reagent is capable of binding a calibration probe.

92. (Previously Presented) The method of claim 85, wherein the capture reagent comprises a polyelectrolyte.